Access Grid 2.0

Open Architecture and Interfaces

Today's Access Grid

- Scale
  - 80+ Nodes
  - 3-5 Venues? (Who's got one?)
- Venues Scheduled for meetings every day
  - We've fully booked the venues server for multiple days
  - New venues servers are cropping up
- Lots of support issues
  - Nodes haven't gotten much easier to use
  - Last years control talk outlined the node side
  - Prototype of control software in alpha at ANL
  - Scheduling Policy Discussions on AG-Tech
- Scaling to be bigger than us
  - "The Community" is growing, contributions are increasing (though not at the scale of # of Nodes)
  - Users are differentiating based on development interest, usage, and goals

Access Grid 1.0
Prototype

- **Virtual Venues Services**
  - Basic Capabilities Established – statically configured
    - HTTP/PHP/PostgresQL
  - Security – per venue Access Control Lists manually managed on venues server
    - ACL in the venue database
  - Scheduling – evolved from ad hoc coordination to formal schedulers at ANL, NCSA & UK
- **Network Services**
  - Network Bridging – manual configuration, ad hoc usage, ANL-centric
  - Telco Bridging – critical fallback technology when networks failed
    - Not used enough for people to configure until an emergency
  - VRVS Bridging – value added by bringing in other communities
    - Request for it, not utilized heavily
  - NLANR Multicast Beacon – critical tool for diagnosis
- **AG Nodes**
  - Single hardware configuration supported
- **Application Services**
  - Vic/vtk – remote visualization
  - Distributed PowerPoint
  - Voyager – venue archiving and playback

Access Grid 2.0
Reference Release

- Virtual Venues Services
  - Venues Server Client Interface
    - Venues Description Standard
  - Per Venue
    - Scheduling
    - Authorization
    - Services
  - Venues Server Configuration
    - A Venue implicitly provides:
      - Scoping
      - Presence
      - Persistence
    - Service Registry
      - Interface for adding and removing Services
    - Identity
      - List of Trusted Identity Services
      - Interface for adding and removing Identity Services

- Network Services
  - Define Standards
  - Prototype Services
  - Watch the Community
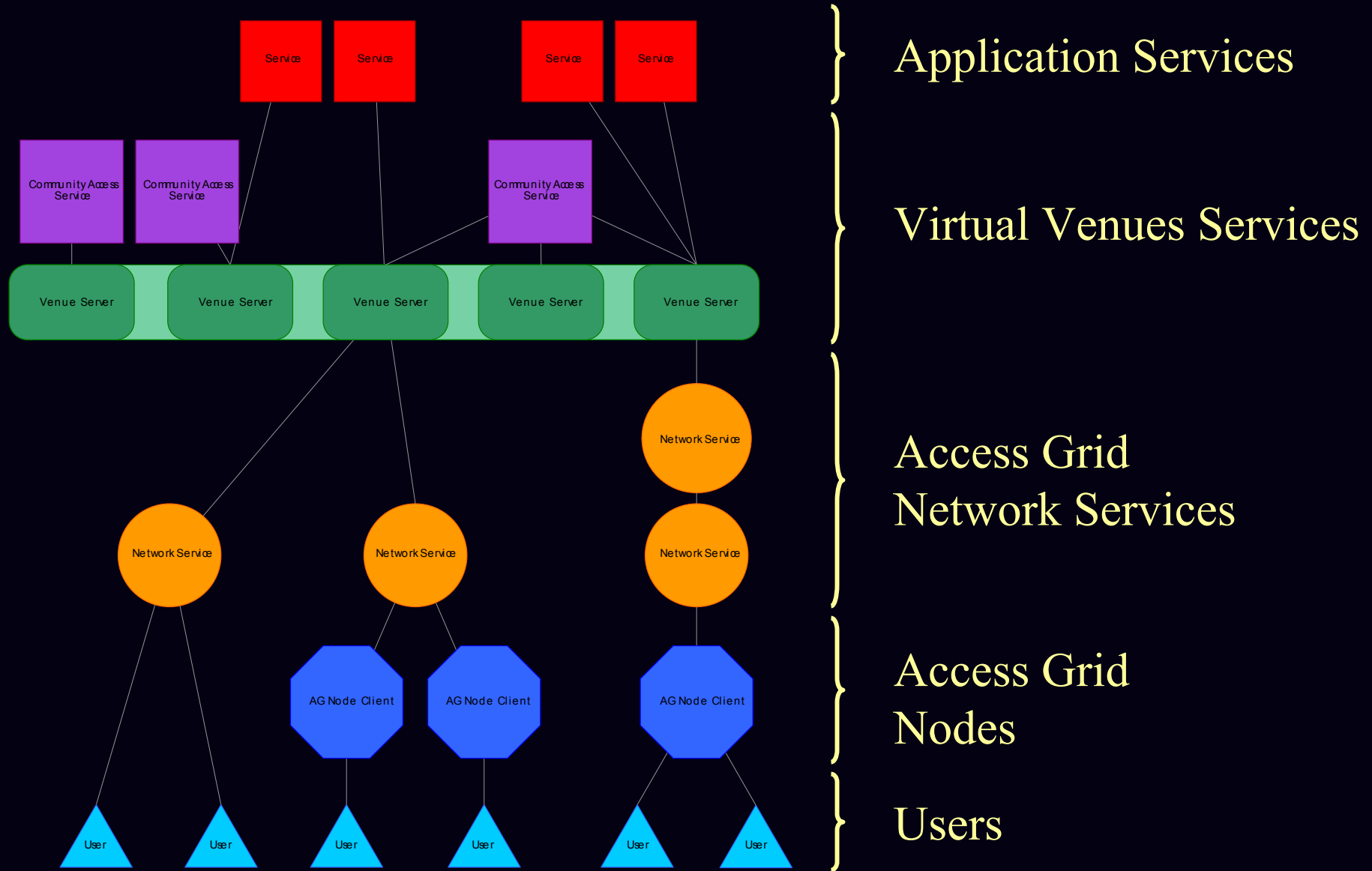
- AG Nodes
  - Minimum Functional Requirements
  - Test Suite to Measure Performance
  - Watch the Community

- Application Services
  - Define Standards
  - Target a small number of external communities
  - Enable them by attacking application integration

Access Grid 2.0 Architecture

Application Services

Virtual Venues Services

Access Grid Network Services

Access Grid Nodes

Users

Service · Service · Service · Service

Community Access Service · Community Access Service · Community Access Service

Venue Server · Venue Server · Venue Server · Venue Server · Venue Server

Network Service · Network Service · Network Service · Network Service

AG Node Client · AG Node Client · AG Node Client

User · User · User · User · User · User

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Virtual Venues Services

- Per Venue
  - Scheduling
  - Authorization
  - Services
- Server Configuration Information
  - A Venue implicitly provides:
    - Scoping
    - Presence
    - Persistence
  - Service Registry
    - Interface for adding and removing Services
  - Identity
    - List of Trusted Identity Services
    - Interface for adding and removing Identity Services
- Venues Server Client Interface
  - Venues Description Standard

- Venue Server Interfaces
  - Add/Remove Service
  - Configure Service
  - Create/Destroy Venue
  - Add/Remove Authorization to Create/Destroy venues

- Venue Interfaces
  - Authorize/Revoke Modification of venue or resource in venue
  - Add/Remove Resource

Community Access Service	Community Access Service

Venue Server	Venue Server	Venue Server
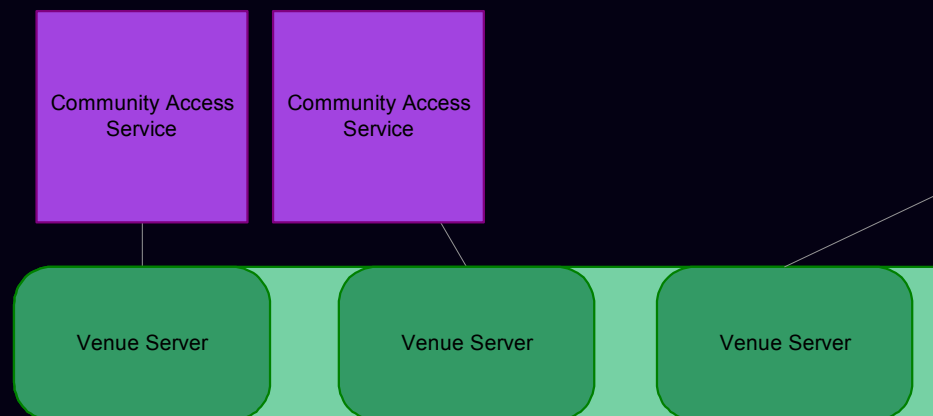
Network Services

Network Service

Network Service

Network Service

- **Network Services**
  - Network Services Description
    - Services have to describe themselves in a way that they can be used
    - Questions include:
      - How to get data
      - What formats are understood
      - Where to put resulting data
      - Who is allowed to invoke a service
    - Higher level questions include:
      - How do you find a service
      - How does a service leverage the AG security tools
  - Activities
    - Draft Service Description Standard
    - Prototype Services
      - Capabilities Matching
      - Video Stream Selection
      - Audio Transcoding 8KHz/16KHz
  - Watch the Community
    - What services will people write?

  - Stream Modification
    - Stream Selection
    - Subsampling
    - Compositing
  - Stream Transmogrifications
    - Text to Speech
    - Speech to Text
    - Language Translation
    - Face Identification
    - Gaze Rendering
  - Network Layer Interaction
    - Monitoring – NLANR Beacon
    - Adaptation – dynamic bridging
    - Reservation of resources
  - Engage other tools
    - VRVS
    - Open H.323
    - Laptop and/or Desktop users

Node Clients

- AG Nodes
  - Minimum Functional Requirements
    - Draft out, being reviewed by AGDP and the community
  - Test Suite to Measure Performance
    - Based on the Minimum Requirements automatic tests can be constructed to measure performance
    - Need volunteers to engage this development effort
  - Node Control Architecture Draft under internal review
    - Web Services Based Node Control Software
    - No hardware configuration is assumed
  - Watch the Community
    - Let's see what people build
    - Small portable solutions are interesting, but are clearly not nodes
      - Laptops
      - Desktops
    - Exotic Hardware integration would be cool
      - Microscopes
      - Ultrasound machines

AG Node Client

AG Node Client

Application Services

- **Defining Application Services**
  - Service Description Standard
    - Services have a standard description
    - Classes of services might share common description components
  - Service Registry Interface
    - Services are provided via Venues Service Registry Interface
  - Prototype real world applications:
    - Target a small number of external communities
    - Enable them by attacking application integration

- **Application Services**
  - Data Storage
    - Beta Grid Nodes
    - Voyager Media Storage
  - Applications
    - Visualization Servers
    - Parallel Rendering Farms
    - Mathematica on a Cluster

Service Service   Service Service

Users

- The AG is about enabling users to work collectively as groups
- Workspace Docking: Bringing "My Stuff" into the "AG Space"
- Installing the AG Software on personal computing tools will:
  - Provide a custom venues client
  - Interrogate the local compute tools to identify Hardware/Software Resources
  - Look for authorization information for the resources, prompting the user if necessary
  - Store a set of preferences so that tools can operate with minimal user intervention
- Leverage the AG navigation, scoping and discovery mechanisms to do true peer-to-peer interactions.
- This is also the mechanism, perhaps coupled with stream encryption, that provide robust, dynamic subgroups that span physical spaces.

The Road to Standards

- Appropriate Aspects of the Access Grid will be standardized via
  - Global Grid Forum and/or,
  - Internet Engineering Task Force

- Standardization Process
  - Draft Standard Kicked around on AGTech
  - Reference code prototyped during draft kicking
  - The next GGF/IETF meeting draft standards are presented
  - Feedback from GGF/IETF sends a proposed standard back to AG Community for refinement
  - When approved by the GGF/IETF, the standard is finished

- For things not appropriate to Standardize
  - Draft documentation will be kicked around via AGTech
  - Documents will appear via the Access Grid Documentation Project, after appropriate review

Looking for a few good volunteers...

- The processes described previously are open to any interested participant
- Argonne has limited resources dedicated to:
  - Architecture, Standardization, Background Documentation
  - Reference System Development, Implementation
  - AG Community Support
  - Engaging application communities
- Our resources don't scale to the size the AG
- Potential critical sub-masses:
  - UK/EU AG
  - Asia/Pacific AG
  - US Educational Community
- Please contact one of the Argonne AG People if interested in these opportunities

...death, dismemberment, and frost-bite unlikely.